CÁTIA V. CARDOSO

Address: University of Exeter – School of Physics, EX4 4QL, Exeter, UK
Telephone: 00351 918599627
Email: catia@astro.ex.ac.uk
Webpage: www.astro.ex.ac.uk/people/catia

Nationality: Portuguese
Date of birth: 03/03/1985

CURRENT RESEARCH

My current research is on the observational properties of brown dwarfs and the mass distribution on the low mass end of the IMF. I have studied the mass distribution, down to the brown dwarf limit, on the double cluster h & X Persei, using I, Y, J, H and Ks data from *WIRCAM* and *MEGACAM (CFHT)*. This work has been developed in collaboration with Jérôme Bouvier, and Estelle Moraux in Grenoble. On a more detailed and precise level, I have studied the absolute and relative astrometric movement of the closest brown dwarf binary system to Earth ε Indi Ba, Bb, since 2004. I have calculated dynamical masses (system mass and individual masses) with very high precision completely independently of evolutionary models. I have used data from *NACO* and *FORS2* on the *VLT*. This work is being developed with Mark J. McCaughrean.

EDUCATION / RESEARCH

University of Exeter, UK **11/2007 – Expected completion, September 2011**
Ph.D. student / Early Stage Research Marie Curie Fellow part of CONSTELLATION, a European Commission FP6 Marie Curie Research Training Network (MRTN-CT-2006-035890).
Thesis: ***"Observational properties of brown dwarfs and the low-mass end of the IMF"***
Supervision: Mark J. McCaughrean, Frédéric Pont

European Space Agency (ESTEC), the Netherlands **1/2011 – 4/2011**
Stage at the Research & Scientific Support Department (SRE-S), in the Directorate of Science and Robotic Exploration.
Supervision: Mark J. McCaughrean

Laboratoire d'Astrophysique de l'Observatoire de Grenoble, France **10/2009 – to present**
Research collaboration: ***"A multi band photometric survey of the double cluster h & χ Persei double"***
Collaborators: Jérôme Bouvier, and Estelle Moraux

Faculty of Sciences at the University of Porto, Portugal **9/2003 – 09/2007**
"Licenciatura" in Physics / Applied Mathematics

PUBLICATIONS

PhD thesis: Observational properties of brown dwarfs and the low-mass end of the IMF
Cardoso, C. V.; in prep.

ε Indi Ba, Bb: System mass via AO imaging of relative orbit
McCaughrean, M. J.; Cardoso, C. V.; Close, L. M.; Scholz, R.-D.; Lenzen, R.; Brandner, W.; Lodieu, N.; Zinnecker, H.; Koehler R.; Konopacky, Q. M.; in prep.

ε Indi Ba, Bb: Individual masses via wide-field absolute astrometry (test to the evolutionary models)
Cardoso, C. V.; McCaughrean, M. J.; Close, L. M.; Scholz, R.-D.; Lenzen, R.; Brandner, W.; Lodieu, N.; Zinnecker, H.; Koehler R.; Konopacky, Q. M.; in prep.

A deep multi band photometric survey of the double cluster h & χ Persei
Cardoso, C. V.; Moraux, E.; Bouvier, J.. ; in prep.

A deep photometric survey of the double cluster h & χ Persei.
Cardoso, C. V.; Moraux, E.; Bouvier, J.. 2010, Proceedings of JENAM 2010.

Dynamical masses for the nearest brown dwarf binary: ε Indi Ba, Bb.
Cardoso, C. V. ; McCaughrean, M. J.; King, R. R.; Close, L. M.; Scholz, R.-D.; Lenzen, R.; Brandner, W.; Lodieu, N.; Zinnecker, H.; Koehler R.; Konopacky, Q. M.. 2010, XXVIIth IAU General Assembly proceedings, Highlights of Astronomy, Volume 15, p761.

Dynamical masses for the nearest brown dwarf binary: ε Indi Ba, Bb.

Cardoso, C. V. ; McCaughrean, M. J.; King, R. R.; Close, L. M.; Scholz, R.-D.; Lenzen, R.; Brandner, W.; Lodieu, N.; Zinnecker, H.. 2009, Proceedings of Cool Stars XV, p509.

Supernova 2008dq.

Dennefeld, M. et al. including Cardoso, C.. 2008, CBET 1421,1.

PRESENTATIONS & WORKSHOPS

- **The Origin of Stellar Masses**, Tenerife, Spain, 18 to 22 October 2010:
  Talk: *"CONSTRAINING THE EVOLUTIONARY MODELS: Dynamical masses of the brown dwarf binary: ε Indi Ba, Bb".*
- **JENAM 2010**, Lisbon, Portugal, 6 to 10 September 2010:
  Poster presentation: ***"****A deep photometric survey of the double cluster h & χ Per".*
- **(Sub)millimeter Observing Techniques in the Herschel Era**, Saclay, France, 19 to 21 May 2010.
- **Seminar at CAUP**, Porto, Portugal, 16 December 2009:
  Talk: "*ε Indi Ba, Bb: dynamical masses for the nearest brown dwarf binary".*
- **FOST meeting at LAOG**, Grenoble, France, 2nd October 2009:
  Talk: "*ε Indi Ba, Bb: dynamical masses for the nearest brown dwarf binary*".
- **Work Package 2 progress meeting**, Prague, Czech Republic, 14 to 17 September 2009:
  Poster presentation: "*Dynamical masses for the nearest brown dwarf binary: Eps Indi Ba, Bb*".
- **Joint CONSTELLATION-ESA workshop on formation of brown dwarfs,** Noordwijk, The Netherlands, 9 to 11 September 2009:
  Poster presentation: "*Dynamical masses for the nearest brown dwarf binary: Eps Indi Ba, Bb*".
- **IAU XXVII General Assembly - Special Session 7 – Young Stars, Brown Dwarfs, and Protoplanetary Disks**, Rio de Janeiro, Brazil, 11 to 14 August 2009:
  Talk***:*** *"ε Indi Ba, Bb: Dynamical masses for the nearest brown dwarf binary".*
- Third CONSTELLATION School: *"***X-rays from Star Forming Regions***"*, Palermo, Sicily, 18 to 22 May, 2009:
  Talk: "*Epsilon Indi Ba, Bb: dynamical masses for the nearest brown dwarf binary*".
- Second CONSTELLATION School: "**Numerical astrophysics and its role in star formation**", Cardiff, Wales, 19 to 23 January, 2009.
- **Work Package 3 progress meeting**, Grenoble, France, 6 and 7 January 2009.
- **Cool Stars XV**, St Andrews, Scotland, 21 to 25 July 2008.
  Poster presentation: "*Dynamical masses for the nearest brown dwarf binary: ε Indi Ba, Bb".*
- **Seventh NEON Observing School**, La Palma, Spain, 23June to 5 July 2008.
- First CONSTELLATION school: "**Star Formation at Infrared Wavelengths**", Arcetri, Italy, 27 to 29 May 2008.
- **National Astronomy Meeting 2008**, Belfast, U.K., 31 March to 4 April 2008.
- **Work Package 3 kick-off meeting**, Lyon, France, 8 and 9 January 2008.
- Participation on the 2nd (2004), 4th (2006) and 5th (2007) **"Sciences, Education and Innovation Fair"**, with FCUP and CAUP, Porto, Portugal.

OBSERVING EXPERIENCE

NACO on the VLT (UT4) since 2004 to present, and FORS2 on the VLT (UT1) since 2005 to present, in service mode:

For the proposal: "ε Indi Ba, Bb: individual dynamical masses for the nearest known binary brown dwarf system".

WIRCam and Megacam on CFHT, I, Y, J, H and K_s data, in service mode:

For the proposal*: "Isolated Planetary Mass Objects (IPMOS): nearing the end of the IMF"*

VIMOS on the VLT (UT3), 3rd to 8th August (6 half nights) 2008, in visitor mode:

For the proposal: "Characterizing the IMF of a range of high-mass star-forming regions with the VLT and Chandra".

IDS on the INT and ALFOSC on the NOT, 25th, 26th and 29th of June 2008:

Part of NEON Observing School program.

TELESCOPE PROPOSALS

I am co-investigator in a series of proposals for the dynamical mass determination of ε Indi Ba, Bb using absolute and relative astrometric measurements.

Proposal: *"ε Indi Ba, Bb: individual dynamical masses for the nearest known binary brown dwarf system"*.

I am also co-investigator in a proposal to determine the age of the ε Indi B system by performing asteroseismology in ε Indi A.

Proposal: *"Age determination of the nearest known brown dwarfs via asteroseismology of their parent main sequence star"*.

TEACHING EXPERIENCE

Teaching Assistant in the first year astronomy laboratory, University of Exeter (2nd semester 2009):

Demonstrating laboratory experiences related with astronomy using IRAF and DS9, correcting and marking student's reports.

Teaching at The Maynard School, Exeter (11 / 2008):

Presenting a course about Star Formation at an Exeter local school entitled: "Birth, Life and Death of Stars".

Monitor of the Portable Planetarium (STARLAB), and monitor of the Laboratories of Astronomy, CAUP, Porto (9 /2005 to 9 / 2007):

Presenting public sessions, to all kind of publics, about astronomy. The STARLAB consisted on a slide presentation of Star Formation and the Solar System, and the display of the constellations. The Laboratories of Astronomy where based on a first approach to the visualization of the solar spectrum, and rare gases spectra.

PERSONAL SKILLS AND COMPETENCES

Languages: Portuguese, English (C2), French (B2).

Operating Systems: Microsoft Windows, Linux and Mac OS X

Programming Skills: Python/Pyraf, IDL, Matlab, Visual Basic, QBasic, FORTRAN (basics), awk (basics)

Applications: IRAF, Sextractor (includind PSFEX), LaTeX, Gimp, VO tools including Aladin, TOPCAT and Stilts.

Technical competences: Ability to work with large data sets, fitting and finding long-term trends.
Experience with astronomical data (large data sets from NACO and FORS2 (VLT), Wircam and Megacam (CFHT), IDS (INT) and ALFOSC (NOT)).
Experience in the (oral and written) presentation of my research in international conferences and in the writing of proposals.

Social competences: Good ability to work in international environments.
Fast adapting to different work environments.
Motivated and driven to find new solutions to problems and learn about new subjects.